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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/927,068	08/09/2001	Jianhui Chen	TWI-13600	4935
28584	7590	08/11/2004	EXAMINER	
STALLMAN & POLLOCK LLP SUITE 2200 353 SACRAMENTO STREET SAN FRANCISCO, CA 94111			STOCK JR, GORDON J	
			ART UNIT	PAPER NUMBER
			2877	

DATE MAILED: 08/11/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/927,068

Applicant(s)

CHEN ET AL.

Examiner

Gordon J Stock

Art Unit

2877

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 01 June 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-51 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-18, 21-25, 27-44 and 47-51 is/are rejected.
- 7) ☒ Claim(s) 19, 20, 26, 45 and 46 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION***Claim Rejections - 35 USC § 103***

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.
2. **Claims 1-4, 16-18, 21-25, 27-31, 42-44, 47-49, 51** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Kokubo et al. (5,686,993)—cited by applicant.**

As for **claims 1-4, 16-18, 22-25**, Kokubo in a method and apparatus for measuring film thickness discloses the following: a first broadband light source that is incandescent within the visible region, a halogen source (Fig. 1: HL); a second discharge light source for providing ultraviolet to visible light, a deuterium lamp (Fig. 1: DL) that is substantially transparent for it is see through (col. 4, line 64); a first transmissive optical system for directing radiation from the first light source through the second light source (Fig. 1: L of 20); a second optical system of transmissive and reflective optics for directing light to an aperture stop (Fig. 1: EM1, EM2, GL of 20); an aperture stop (Fig. 1: FS of 20); a third optical system of reflective optics for focusing light to sample (Fig. 1: HM; 30). As for particular focal positions, Kokubo does not explicitly state focal positions. However, he states that the halogen lamp, deuterium lamp, and glass rod end are conjugate with the light focused on the field stop (col. 5, lines 3-10) and the conjugate relation of the sample with the aperture stop and the imaging system's pupil (col. 5, lines 40-55). Therefore, it would be obvious to one skilled in the art at the time the invention was made that the first focal position is the second light source, the second focal position is at the aperture stop, and the aperture stop's is imaged on the sample, for they all have a conjugate relation with each other.

As for **claims 21 and 27**, Kokubo discloses everything as above (see **claims 1 and 22**). He does not explicitly state that a spectroscopic reflectometer is used. However, he teaches that a spectroscope is part of the system (Fig. 1: 40) and reflectances are measured (col. 7, lines 15-35; col. 8, lines 1-20). It is well known in the art that reflectometers measure reflectance. Therefore, it would be obvious to one skilled in the art that the spectroscopic system that measures reflectance is a spectroscopic reflectometer for reflectometers measure reflectance.

As for **claims 28-31, 42-44, 51** please refer to similar limitations of **claims 1-4, and 16-18** above. In addition, Kokubo discloses a detection system (Fig. 1: 40) and a processor (Fig. 1: 50); whereas, the change in intensity of radiation at a plurality of wavelengths are analyzed (Fig. 4: S206; Fig. 5a-5b; col. 8, lines 1-25).

As for **claims 47-49**, Kokubo discloses everything as above (see **claim 28**). He does not explicitly state that a spectroscopic reflectometer is used. However, he teaches that a spectroscope is part of the system (Fig. 1: 40) and reflectances are measured (col. 7, lines 15-35; col. 8, lines 1-20). It is well known in the art that reflectometers measure reflectance. Therefore, it would be obvious to one skilled in the art that the spectroscopic system that measures reflectance is a spectroscopic reflectometer for reflectometers measure reflectance.

3. **Claims 5-13, 15, 32-39, and 41** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Kokubo et al. (5,686,993)** --cited by applicant and further in view of **Carlson et al. (4,771,629)**—previously cited.

As for **claims 5 and 32**, Kokubo discloses everything as above (see **claims 1 and 28**). He is silent concerning the similarity of spectra of both lamps and suggests differences for the deuterium is a uv-vis source (col. 4, lines 65-67). Carlson discloses that halogen sources provide

Art Unit: 2877

infrared as well (col. 11, lines 10-20). Kokubo's system preferentially measures from 200 to 400 nm (Figs. 5a and 5b). Halogen lamps are well known in the art for providing heat. Therefore, it would be obvious to one skilled in the art to have the system comprise two sources of similar spectral emission such as two deuterium lamps in order to measure film profiles in the 200 to 400 nm and to eliminate excessive heat and to eliminate needless infrared emission as produced by a halogen source.

As for **claims 6-8, 10, 13, 33-35, 39**, Kokubo discloses everything as above (see **claims 1 and 28**). He does not explicitly state that the two sources have different spectra but implies it by stating that the deuterium lamp is a uv-vis source (col. 4, lines 65-67). Carlson discloses the difference between halogen sources and deuterium (col. 11, lines 10-20) and the functional equivalence of tungsten and halogen sources. Therefore, it would be obvious to one skilled in the art that the halogen source has a different spectra than the deuterium lamp, for the halogen source emits in the infrared. In addition, it would be obvious to one skilled in the art to have the system have a tungsten rather than halogen, for these two sources are functionally equivalent to each other.

As for **claims 9, 11, 12, 15, 36, 37, 38, 41**, Kokubo discloses everything as above (see **claims 1 and 28**). He is silent concerning the particular light sources being either a combination of xenon and deuterium or both being xenon or deuterium lamps. Kokubo does demonstrate that the system preferentially measures from 200 to 400 nm (Figs. 5a and 5b) and that the deuterium source provides 200 nm to 800 nm light (col. 4, lines 65-67). Carlson discloses that halogen sources are infrared emitters and that deuterium and xenon lamps are functional equivalents (col. 11, lines 10-20). In addition, it is well known in the art that halogen lamps provide heat.

Art Unit: 2877

Therefore, it would be obvious to one skilled in the art to have the system comprise two sources of similar spectral emission such as two deuterium lamps, two xenon lamps, or a deuterium lamp and xenon lamp in order to measure film profiles in the 200 to 400 nm region and to eliminate excessive heat and eliminate needless infrared emission as produced by a halogen source and that xenon and deuterium lamps are functionally equivalent spectrally.

4. **Claims 14 and 40** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Kokubo et al. (5,686,993)—cited by applicant** in view of **Sei et al. (WO 01/06173)—cited by applicant**.

As for **claims 14 and 40**, Kokubo discloses everything as above (see **claims 1 and 28**). He is silent concerning the first light source being a tungsten-halogen lamp. However, Sei in a composite light source teaches the equivalence of a halogen lamp and a metal halide lamp (lines 10-12 of page 18 of translation). Therefore, it would be obvious to one skilled in the art at the time the invention was made to substitute the halogen light source with a tungsten-halogen source, for the halogen lamp and metal-halide source are art recognized equivalents in composite light sources.

5. **Claim 50** is rejected under 35 U.S.C. 103(a) as being unpatentable over **Kokubo et al. (5,686,993)—cited by applicant** in view of **Hallmeyer et al. (6,504,608)—cited by applicant**.

As for **claim 50**, Kokubo discloses everything as above (see **claim 28**). However, he is silent concerning a spectroscopic ellipsometer. However, Hallmeyer in an optical measurement arrangement with a coaxial illumination system teaches having also an ellipsometric detection system with the spectrophotometric system to provide more complex layer systems of wafers to be measured (col. 10, lines 25-35; Fig. 1: 45). Therefore, it would be obvious to one skilled in

the art to have the detection system also include a spectroscopic ellipsometer system to provide even more reliable measurements of complex layer systems of samples.

Allowable Subject Matter

6. **Claims 19, 20, 26, 45, and 46** are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

As to **claim 19**, the prior art of record, taken alone or in combination, fails to disclose or render obvious in an illuminator “said third optical system is arranged to segregate polarization states,” in combination with the rest of the limitations of **claim 19**.

As to **claim 20**, the prior art of record, taken alone or in combination, fails to disclose or render obvious in an illuminator “said third optical system includes a Rochon prism” in combination with the rest of the limitations of **claim 20**.

As to **claim 26**, the prior art of record, taken alone or in combination, fails to disclose or render obvious in an illumination method forming a polarized image of the aperture stop in combination with the rest of the limitations of **claim 26**.

As to **claim 45**, the prior art of record, taken alone or in combination, fails to disclose or render obvious in an apparatus for evaluating characteristics of a sample said third optical system forms a polarized image of the aperture at the sample in combination with the rest of the limitations of **claim 45**.

As to **claim 46**, the prior art of record, taken alone or in combination, fails to disclose or render obvious in an apparatus for evaluating characteristics of a sample the third optical system includes a Rochon prism in combination with the rest of the limitations of **claim 46**.

Art Unit: 2877

Response to Amendment and Arguments

7. The amendment received on June 1, 2004 has been entered into the file.
8. The declaration filed on June 1, 2004 under 37 CFR 1.131 has been considered and is effective in overcoming the **Mikkelsen et al. (6,600,560)** reference. Subsequently, the rejections with the **Mikkelsen et al. (6,600,560)** reference have been withdrawn. In addition, Applicant's arguments with respect to the claims have been considered but are moot in view of the new ground(s) of rejection. See above.

Fax/Telephone Numbers

If the applicant wishes to send a fax dealing with either a proposed amendment or a discussion with a phone interview, then the fax should:

- 1) Contain either a statement "DRAFT" or "PROPOSED AMENDMENT" on the fax cover sheet; and
- 2) Should be unsigned by the attorney or agent.

This will ensure that it will not be entered into the case and will be forwarded to the examiner as quickly as possible.

Papers related to the application may be submitted to Group 2800 by Fax transmission. Papers should be faxed to Group 2800 via the PTO Fax machine located in Crystal Plaza 4. The form of such papers must conform to the notice published in the Official Gazette, 1096 OG 30 (November 15, 1989). The CP4 Fax Machine number is: (703) 872-9306

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gordon J. Stock whose telephone number is (571) 272-2431.

The examiner can normally be reached on Monday-Friday, 10:00 a.m. - 6:30 p.m.

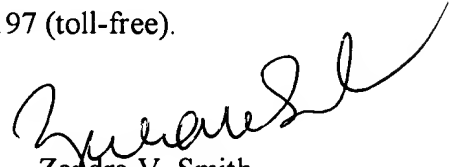
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory J. Toatley, Jr., can be reached at 571-272-2800 ext 77.

Art Unit: 2877

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private Pair system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


gs

July 28, 2004


Zandra V. Smith
Primary Examiner
Art Unit 2877